

Reference 2. JP Patent Publication (Kokai) No. 48-013557 (1973)

Title of the invention:

Aerosol dentifrice

The claim:

An aerosol dentifrice characterized by the formulation of a physiologically harmless, water insoluble, inert agent with a boiling point (1atm) of from about 20°C to 36°C at more than 0.5%.

Page 2, upper right column, line 4 to lower left column, line 2 (background of the invention):

In many cases it is difficult to achieve shape retention-ability together with dispersibility. While it may be relatively easy to achieve a dentifrice with good shape retention-ability, there is a limit to improving the dispersibility and yet maintaining the shape retention-ability for conventional tooth pastes howsoever the binder or other constituent element is optimized and furthermore, a dentifrice which disperses immediately as well as completely when put into the mouth is quite impossible to achieve. Moreover, even for a dentifrice with a general composition, in order to achieve a dentifrice stable over time with good dispersibility, not only is it necessary to select the binder but also the abrasive and other components suitable for this purpose. However, usually it is difficult to confer good dispersibility when the purpose is to achieve a dentifrice with a specific composition. For example, when the dentifrice comprises a large amount of salt (dietary salt, other alkaline metal salt, or bivalent or more water soluble metal salt) it is necessary to use a binder with good salt resistance. However, when using such binder with good salt resistance the dispersibility would be unsatisfying and this would require further special elaboration.

Page 2, lower right column, lines 3-8:

By conducting various studies, the present inventors have accomplished the present invention by providing a novel aerosol dentifrice with an ability only achievable by using an aerosol type dentifrice, specifically an immediate dispersibility when put into the mouth which was unavailable with conventional toothpastes in tubes and conventional aerosol dentifrices.

Page 3, upper left column, lines 4-11:

The major characteristic of the dentifrice of the present invention is the highest level dispersibility by which the dentifrice itself spontaneously foams within the mouth due to the generating gas. Therefore, there is no constraint of including any binder or other component to improve the dispersibility. Furthermore, the dentifrice immediately disperses within the mouth and provides not only a fine, good, rich foam at a rate unachievable with customary dentifrices, but also good arising and spreading of the perfume.

Page 3, upper right column, lines 4-12:

Physiologically harmless, water insoluble and chemically stable agents used in the present invention can appropriately be selected from saturated hydrocarbons, halogenated hydrocarbons, and the like. Agents having a boiling point within this range include Freon 11 (CCl_3F , boiling point $23.77^{\circ}C$, evaporation heat 45.51 cal/g), isopentane ($CH_3-CH(CH_3)-CH_2-CH_3$, boiling point $28^{\circ}C$, evaporation heat 80.9 cal/g), pentane ($CH_3-(CH_2)_3-CH_3$, boiling point $36.2^{\circ}C$, evaporation heat 85.37 cal/g), and the like.

Page 4 Working example 1:

dibasic calcium phosphate dihydrate	49.0 parts
carboxymethyl cellulose	0.75 parts
bentonite	1.0 parts
sodium lauryl sulfate	1.0 parts
glycerin	18.0 parts
water	28.08 parts
perfume	1.0 parts
saccharin	0.15 parts
bactericide, dye	0.02 parts
Freon 11	1.0 parts